

Serial No.: 10/611,845
Filed: July 1, 2003

Office Action Date: April 12, 2005
Amendment Date: June 23, 2005

REMARKS/ARGUMENTS

Subsequent to the Office Action issued on 12 April 2005, claims 1-36 are pending in the Application. By this response to the Office Action, claims 17, 20, 22, 23, 24, 25, 28, and 29 have been amended, and claims 15, 16, and 19 have been canceled. New claims 37 - 42 have been added. Claims 1-14, 17, 18, and 20 - 42 remain in consideration.

Allowable Subject Matter

Examiner stated that claims 1-14 and 30-36 were allowable. Inventors express appreciation for this acknowledgment of patentable subject matter.

Claim Rejections – 35 U.S.C. § 102(b)

Claims 15-19 were rejected under 35 U.S.C. § 102(b) as being anticipated by *Iida, et al. '813*. Claim 17, newly independent, has been amended to incorporate the patentable subject matter of Claims 15 and 16. Claims 15, 16 and 19 have been canceled herein, in order to put this application in condition for allowance, and not for reasons related to patentability.

Applicant respectfully traverses any rejection of amended Claim 17, in view of *Iida, et al. '813*. *Iida, et al. '813* discloses a four-cycle internal combustion engine having electromagnetically driven engine valves, and a method and apparatus to control exhaust gas recirculation thereby. It was stated by the examiner with regard to Claim 17 that Fig. 12 of *Iida, et al. '813* discloses the exhaust event exhaust valve closure absolute phase relative to exhaust stroke top dead center is not greater than the intake valve opening phase after exhaust stroke top dead center.

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Applicant respectfully disagrees with the examiner's interpretation of Fig. 12. There is insufficient detail in the written description of *Iida*, et al. '813 to describe valve operation relative to crank position (See Col. 11, Lines 22-37). However, Fig. 12 unambiguously shows a discernible amount of overlap between an intake valve opening and an exhaust valve opening for each engine cylinder at the respective exhaust top dead center position. Applicant argues that the instant invention as described in newly amended Claim 17 is patentably distinguishable over *Iida*, et al. '813, because the cited art neither teaches nor describes the exhaust event exhaust valve closure absolute phase relative to exhaust stroke top dead center is not greater than the intake valve opening phase after exhaust stroke top dead center, as described in Claim 17.

Applicant respectfully traverses any rejection of Claim 18, in view of *Iida*, et al. '813. Referring to Fig. 12 again, it unambiguously shows a discernible amount exhaust valve opening for each engine cylinder after the respective exhaust top dead center position. Applicant argues that the instant invention as described in Claim 18 is patentably distinguishable over *Iida*, et al. '813, because the cited art neither teaches nor describes the exhaust event exhaust valve closure occurs before exhaust stroke top dead center, as described in Claim 18.

Claim Rejections – 35 U.S.C. § 103(a)

Claims 20 – 29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Iida*, et al. '813. Claims 20, 22, 23, 24, 25, 28, and 29 have been amended to be ultimately dependent upon now allowable independent claim 17. Therefore, applicant respectfully asserts that claims 20 -29 are allowable for the same reasons as set forth for independent claim 17, and reconsideration is respectfully requested.

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New Claims

New claims 37 – 42 have been added to more particularly point out and distinctly claim the patentable subject matter of the invention. No new subject matter has been added with these claims.

New claim 37, based upon Claims 15 and 3, sets forth a method of operating a four-stroke internal combustion engine, comprising, *inter alia*, establishing a low pressure event within the combustion chamber during the intake stroke of the piston, and, establishing a combustion chamber rebreathe event during the intake stroke of the piston by controlling a rebreathe event exhaust valve opening and closing wherein the rebreathe event exhaust valve opening occurs during the low pressure event. The low pressure event terminates not earlier than about 75 degrees past exhaust stroke top dead center.

New claim 38, dependent upon claim 37, sets forth the low pressure event reaches at least about 42 kPa sub-atmospheric. Consideration of claims 37 and 38 is respectfully requested.

New claim 39 sets forth a method of operating a four-stroke internal combustion engine comprising, *inter alia*, operating the four-stroke internal combustion engine in a substantially unthrottled condition; establishing a low pressure event within the combustion chamber during the intake stroke; and, establishing a combustion chamber rebreathe event during the intake stroke by controlling a rebreathe event exhaust valve opening and closing occurring during the low pressure event. The low pressure event is established by controlling phasing of an exhaust event exhaust valve closure and the intake valve opening. Support in

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the original specification for this claim may be found in Paragraph 0020, and in Figs. 1 and 3.

New claim 40, dependent upon claim 39, sets forth the low pressure event terminates not earlier than about 75 degrees past exhaust stroke top dead center.

New claim 41, dependent upon claim 39, sets forth the low pressure event reaches at least about 42 kPa sub-atmospheric.

New claim 42, dependent upon claim 39, sets forth the low pressure event terminates not earlier than about 75 degrees past exhaust stroke top dead center, and reaches at least about 42 kPa sub-atmospheric. Consideration of claims 39 – 43 is respectfully requested.

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Conclusion

Based upon all of the above, it is respectfully submitted that pending claims 1- 14, 17, 18, and 20-42 are in condition for allowance and that same be allowed to proceed to issue. If the Examiner has any questions regarding the contents of the present response, Applicant's attorney may be contacted at the phone number appearing below during normal business hours (EST).

Authorization is hereby granted to charge General Motors Deposit Account Number 070960 for any fees associated with the addition of claims herein.

Respectfully submitted,



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